Effective Filing date of Applicant's Claims

Each of applicant's claims in this case recite *inter alia* use of ferric chloride, or a composition comprising ferric chloride or aluminum sulfate (claim 16). Insofar as parent application 08/721,557 filed 9/26/1996 does not support, i.e., does not provide an adequate written description of a method involving or formulation comprising either ferric chloride or aluminum sulfate, the effective filing date of applicant's claims in this reissue application correspond to that of the actual filing date of continuation-in-part application 09/055,870, i.e., April 6, 1998.

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Provisional Obviousness Type Double Patenting Rejection Over Application 09/733392

[In the chart below, time proceeds to the right (→)]

|----------|
08/721557 filed USP 5846435 Issued

|----------→
reissue app 09/733392 filed (still pending)

|----------|
CIP 09/055870 filed USP 5906750 issued

|----------→
reissue app 09/866145 filed (this pending application)

Pending 09/733392 claim	Pending 09/866145 claim
1. A method for dewatering biological sludge from a thermophilic digestion process, comprising: a. adding a polymeric quaternary ammonium compound, as primary component, to the biological sludge; and b. adding to the biological sludge a cationic polyacrylamide or separate from the polymeric quaternary ammonium compound adding an anionic polyacrylamide; such that the polymeric quaternary ammonium compound and the polyacrylamide enhance dewatering of the sludge.	1. A method for dewatering thermophilic biological sludge, comprising: a. adding a primary component to the thermophilic biological sludge, the primary component comprising one of: aluminum sulfate, ferric chloride, aluminum sulfate and a polymeric quaternary ammonium compound, ferric chloride and a polymeric quaternary ammonium compound, and aluminum sulfate, ferric chloride and a polymeric quaternary ammonium compound; and b. adding a cationic or anionic polyacrylamide to the thermophilic biological sludge.

Claims 1 – 13, 15 – 20, 39 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 09/733392 in view of USP 6660164 to Stover.

Claim 1 of the 09/733392 application covers a method for dewatering thermophilic biological sludge, comprising: a. adding a polymeric quaternary ammonium compound as primary component to the thermophilic biological sludge, and adding a cationic polyacrylamide to the thermophilic biological sludge. Claim 1 of the 09/733392 application does not require that ferric chloride also be added to the sludge.

USP 6660164 to Stover describes adding ferric chloride 146, 22, 28 (col 8 line 36) to an autothermal aerobic thermophilic digestion process 10 before the thermophilic sludge 138 is dewatered (col 10 line 50) to provide micronutrients, to control odor, and for sulfide complexation and precipitation of sulfide.

It would have been obvious to have added ferric chloride to Haase '435's thermophilic biological sludge prior to dewatering in order to provide a source of micronutrients, to control odor, and/or to complex with and precipitate sulfides, as taught by Stover.

This is a provisional obviousness-type double patenting rejection because the 09733392 application has not yet issued as a reissue patent of USP 5846435.

Claims 1 – 13, 15-20, 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over USP 5954964[1] to Nielsen in view of USP 6660164[2] to Stover and USP 5861100 to Nagasaki.

Nielsen's claim 8 describes a method for digesting and dewatering sludge in a wastewater treatment process, comprising the steps of:

> a) directing wastewater influent through an activated sludge treatment process and producing waste activated sludge;
>
> b) directing the waste activated sludge through an autothermal thermophilic aerobic digestion (ATAD) process and producing biosolids; and
>
> c) mixing a low molecular weight polymer and a high molecular weight polymer with the biosolids and subjecting the mixture of low molecular weight polymer, high molecular weight polymer, and biosolids to a dewatering process for removing water from the biosolids and producing a dewatered treated sludge, wherein at least one of the polymers is a polyacrylamide polymer.

Among the "low molecular weight" polymers disclosed by Nielsen is Percol 406, which USP 5069831 to Schwab states is a poly(diallyldimethylammonium chloride) having a molecular weight of 1.5×10^6 and a 50% charge density. Nielsen does not describe adding ferric chloride to the thermophilic biological sludge.

USP 6660164 to Stover describes adding ferric chloride 146, 22, 28 (col 8 line 36) to an autothermal aerobic thermophilic digestion process 10 before the thermophilic sludge 138 is dewatered (col 10 line 50) to provide micronutrients, to control odor, and for sulfide complexation and precipitation of sulfide.

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[1] Nielsen was filed July 29, 1997, which predates applicant's effective filing date of April 6, 1998.
[2] Claiming priority to provisional application 60/071943 filed Jan. 20, 1998, which predates applicant's effective filing date of April 6, 1998.

As shown by USP 5861100 to Nagasaki, ferric chloride and aluminum sulfate (aka, "alum") are known equivalents for use as primary components useful in generating small flocs subsequently flocculated into larger flocs using a polymeric flocculent.

It would have been obvious to have added ferric chloride to Nielsen's thermophilic digester sludge prior to dewatering in order to provide a source of micronutrients, to control odor, and/or to complex with and precipitate sulfides, as taught by Stover.

None of applicant's claims 2, 3, 5, and 6 requires that the primary component recited in claim 1 be a polymeric quaternary ammonium compound. Applicant's claim 7 does not require that the primary component recited in claim 1 be aluminum sulfate.

Per claim 4, Nielsen describes adding the ferric chloride directly to the thermophilic sludge.

Per claim 8, the relative proportion of chemicals in a formulation is a known result-effective variable, so optimization of the ratio thereof would have been obvious.

Per claim 9, the polymer dosage to solids ratio is a known result-effective variable (see Nielsen top column 7, for example), so optimization of the same would have been obvious.

Per claim 16, Nagasaki suggests substitution of alum for ferric chloride as a primary component.

Claims 1 – 13, 15-20, 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nielsen in view of Field.

US 5954964 to Nielsen describes dewatering a thermophilic sludge with a low MW polymer and a high MW polymer, but does not describe using an inoorganic coagulant like aluminum sulfate or ferric chloride in place of, or in addition to, the low MW polymer.

USP 4043910 to Field facilitates the removal of phosphates from wastewater using both an inorganic coagulant, e.g., ferric chloride, and a cationic polyelectrolyte, e.g., polyacrylamide.

It would have been obvious to have used ferric chloride in combination with Nielsen's low molecular weight polyacrylamide in order to improve removal of phosphorus from Haase's sludge, as suggested by Field.

With respect to the numeric ranges or property values recited in the claims but not specifically addressed in the rejection above, the claimed limitations would have been obvious in view of the recognition in the art that the property, parameter, or limitation is a known result-effective parameter, the optimization of which would have been obvious with no more than routine experimentation.

Response to Arguments

Applicant argues that USP 6660164 to Stover is not prior art because Stover's provisional application 60/071,943 filed on January 20, 1998, "could not have ***published*** prior to January 20, 1999 [sic, "applicant's effective filing date of April 6, 1998"?] [emphasis not in original but added by examiner]. Subject matter of a patent supported by a provisional application is prior art as of the filing date of the provisional

application even though provisional applications are never published. See 35 USC Sec 119(e)(1) which reads in pertinent part (emphasis added):

> 35 U.S.C. §119(e) (1) - An application for patent filed under section 111(a) or section 363 of this title for an invention disclosed in the manner provided by the first paragraph of section 112 of this title in a provisional application filed under section 111(b) of this title, by an inventor or inventors named in the provisional application, ***shall have the same effect, as to such invention, as though filed on the date of the provisional application filed*** under section 111(b) of this title, if the application for patent filed under section 111(a) or section 363 of this title is filed not later than 12 months after the date on which the provisional application was filed and if it contains or is amended to contain a specific reference to the provisional application. . . .

In this case, USP 6660164 to Stover has continuity tracing back to the provisional application through the intermediate application 09/134,557 (now USP 6036862). Accordingly, the subject matter relied upon by the examiner disclosed in Stover '164 is prior art to applicant ion this case.

USP 6660164 to Stover, although based on an application filed ***after*** applicant's effective filing date of April 6, 1998, claims the benefit of provisional application 60/071,943 filed on Jan 20, 1998, ***before*** applicant's effective filing date. Insofar as the subject matter relied upon by the examiner is fully disclosed in Stover's provisional application, that disclosure is prior art against applicant. The subject matter relied upon is described at least at page 37 of Stover's provisional application where Stover discloses that ferric chloride is a "critical" micronutrient for thermophilic treatment systems.

Normally, five separate chemical feed systems are provided to feed the sources NaOH 142, lime 144, $FeCl_3$ or $FeCl_2$ 146, macronutrients 148 and micronutrients 150. Five separate controllable pumps 154 through 162 then control the respective feed sources 142 through 150 to supply input to the recycle line 18. Lime also provides alkalinity and calcium as a micronutrient. $FeCl_3$ and/or $FeCl_2$ are added as a micronutrient, for odor control, and for sulfide complexation, if needed. Either $FeCl_3$ or $FeCl_2$ can be used for sulfide control by complexing or precipitating sulfides as they are formed in the reactor. Sulfate reduction to sulfides is normally controlled and managed by controlling the ORP and oxygen in the reactor vessel.

Both macronutrients (nitrogen and phosphorus) and micronutrients (trace metals) are critical to successful performance of thermophilic treatment systems. Nitrogen and phosphorus levels are normally inadequate in high strength industrial wastes. Aqueous ammonia and phosphoric acid can be used to supply nitrogen and phosphorus, as well as various forms of fertilizers. In addition to the nitrogen and phosphorus requirements, facilities are provided to add the following chemicals to ensure adequate micronutrients are available for growth requirements:

- Ferric chloride/ferrous chloride.
- Calcium chloride
- Ammonium molybdate.
- Nickel chloride.
- Copper sulfate.

The examiner does not dispute applicant's contention that Nagasaki '100 does not describe dewatering of thermophilic sludge. The examiner relies on Nagasaki for evidence of another point altogether: Ferric chloride and aluminum sulfate (aka, "alum") are known equivalents for use as primary components useful in generating small flocs subsequently flocculated into larger flocs using a polymeric flocculent.

It is unclear why Applicant at page 9 of the Response filed June 3, 2010, cites and discusses USP 4043910 to Field in response to the rejection based on Nielsen, Stover, and Nagasaki. To the extent that Applicant intended the remarks concerning

Field '910 to address the §103 rejection of claims 1 – 13, 15 – 20, 39 over Nielsen in view of Field, the examiner again does not dispute applicant's contention that Field '910 does not describe dewatering of thermophilic sludge. Rather, the examiner relies on Field '910 for the teaching that it was known to facilitate the removal of phosphates from wastewater using both an inorganic coagulant, e.g., ferric chloride, and a cationic polyelectrolyte, e.g., polyacrylamide. Accordingly, it would have been obvious to have used ferric chloride in combination with Nielsen's low molecular weight polyacrylamide in order to improve removal of phosphorus from Nielsen's sludge, as suggested by Field.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

/Chester T. Barry/
Primary Examiner, Art Unit 1797
571-272-1152